Presented by
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Vice-President Flight Operations Support

US Airways 1549 NTSB Public Hearing

Airbus Operational Procedures

June 9-11, 2009

Presentation Overview

- **This presentation provides a summary of operational documentation and procedure development, focusing on,**
  - engine dual failure
  - and associated emergency procedures

- **Throughout we differentiate between**
  - a planned ditching with reasonable time to prepare aircraft and passengers.
  - immediate emergency landing on water with limited or no time to prepare

Abnormal And Emergency Procedures Development And Revision

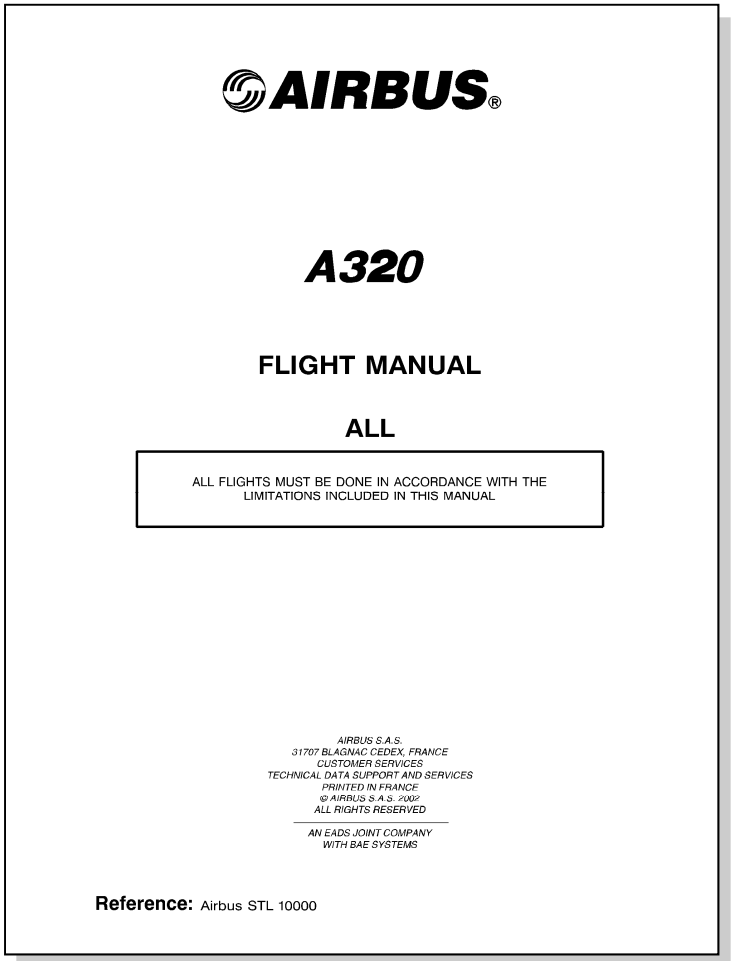
- **All procedures are developed considering**
  - the applicable regulatory requirements and
  - an Airbus analysis of system failure consequences

- **Procedures are revised as a result of:**
  - new or changed regulatory requirements
  - aircraft design changes
  - in-service experience
  - operators feedback
  - training feedback

Documentation

Airbus provides

- Aircraft Flight Manual (AFM) – specifically reviewed and approved by Aviation Authorities; once AFM is approved, all other Airbus and operator documents must be consistent with it


AIRBUS®

A320

FLIGHT MANUAL

ALL

ALL FLIGHTS MUST BE DONE IN ACCORDANCE WITH THE LIMITATIONS INCLUDED IN THIS MANUAL

AIRBUS S.A.S.
31707 BLAGNAC CEDEX, FRANCE
CUSTOMER SERVICES
TECHNICAL DATA SUPPORT AND SERVICES
PRINTED IN FRANCE

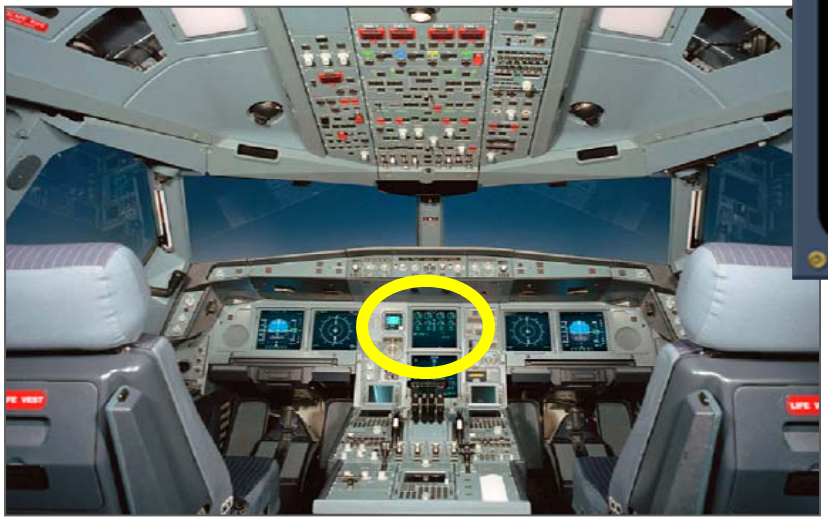
AN EADS JOINT COMPANY
WITH BAE SYSTEMS

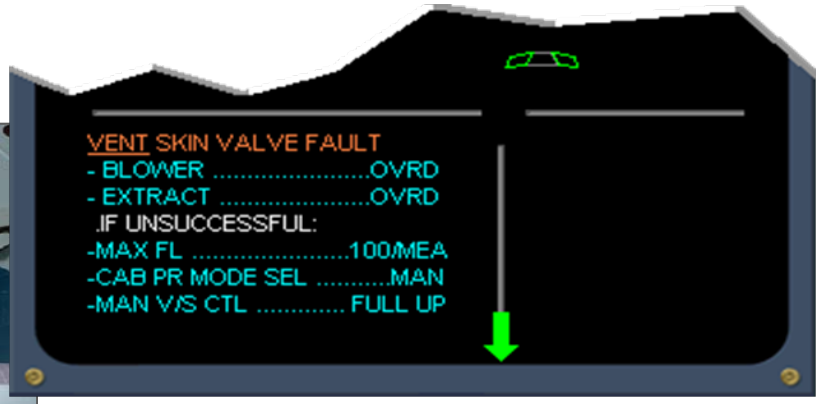
Reference: Airbus STL 10000

Documentation

Airbus provides

- **ECAM** (Electronic Centralized Aircraft Monitoring) – automatically indicates on a cockpit screen the flight crew actions required (consistent with the AFM) to respond to issues the aircraft can auto-detect





Documentation

Airbus also provides reference documents:

- **QRH** (Quick Reference Handbook) – paper document setting out crew actions required in occurrences not detected by the aircraft itself
- **FCOM** (Flight Crew Operating Manual) – contains all ECAM procedures and additional, expanded information
- **FCTM** (Flight Crew Training Manual) – for use in training, not in real time, provides supplemental information on how and why to follow certain procedures

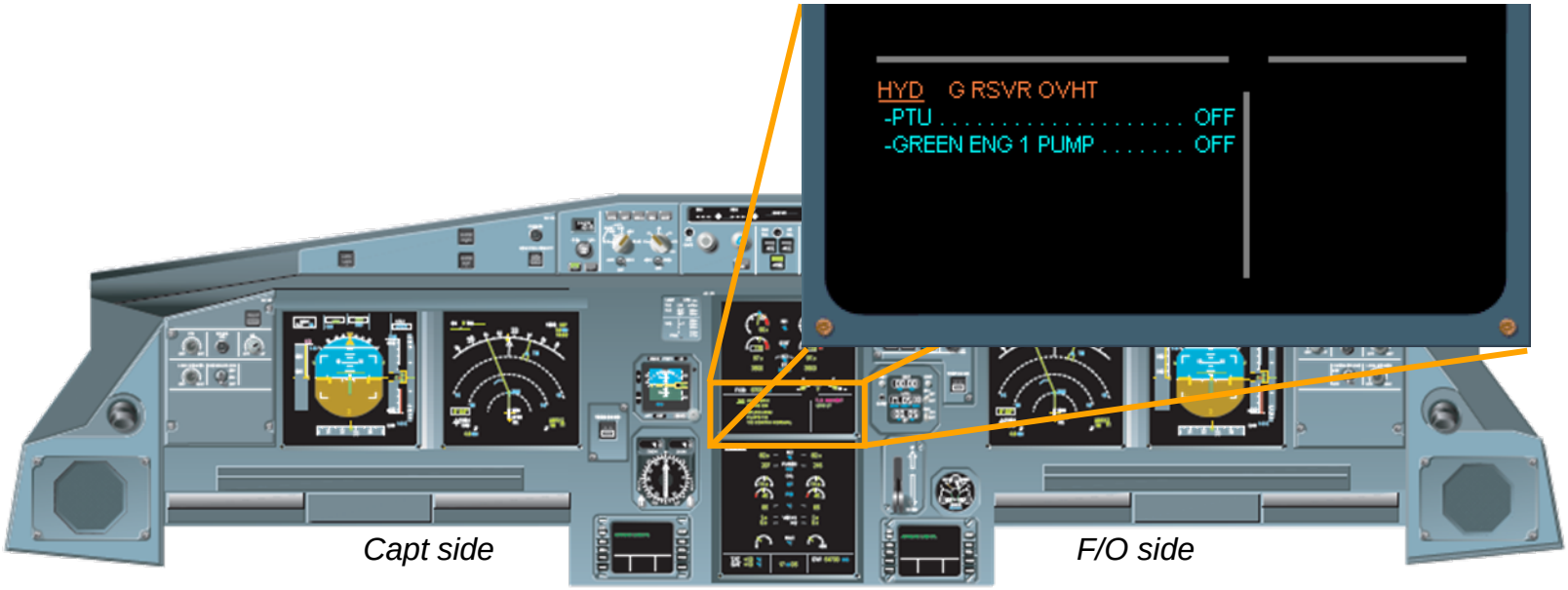
Documentation

Operators can and do modify the QRH, FCOM, FCTM for their respective operations and are responsible for obtaining applicable regulatory approvals for the version they adopt

Abnormal And Emergency Procedures: Execution

ECAM (Electronic Centralized Aircraft Monitoring)

Most abnormal and emergency procedures relate to occurrences that are auto-detected, prioritized and will appear on the ECAM screen in the correct sequence



Abnormal And Emergency Procedures: Execution
(Cont'd)

Quick Reference Handbook (QRH)

The ECAM screen will not present abnormal or emergency procedures if:

- the aircraft systems cannot detect the situation (e.g. volcanic ash encounter), or
- there is a temporary paper revision of an ECAM procedure (screen will say "refer to QRH")

- These procedures are printed in a paper booklet (QRH) available to the flight crew

Abnormal And Emergency Procedures: Execution
(Cont'd)

ECAM exceptions

- Some procedures make use of the QRH more efficient, such as procedures for smoke in the cockpit or Engine Dual Failure

- Therefore, based on the flight crew assessment of the situation as it evolves, the crew can refer to the relevant section of the QRH procedure without the necessity to work through all steps as displayed on ECAM.

Abnormal And Emergency Procedures: Execution
(Cont'd)

"Read and Do" v. "Memory Items"

- Both ECAM and QRH procedures are used according to the "read and do" principle
- Some procedures must be applied without reference to any screen or paper. These are "Memory Items" and relate to situations requiring immediate actions such as windshear or loss of braking

Abnormal And Emergency Procedures
Engine Dual Failure

Designed for high altitude Engine Dual Failure

- **Engine Dual Failure on ECAM**
  - all required actions are displayed on the cockpit screen
  - long procedure
  - need to cross reference other procedures

Abnormal And Emergency Procedures
Engine Dual Failure

QRH – ECAM exception

- Introduced following the experience of an emergency landing with no fuel remaining.
- Makes distinction between “Fuel Remaining” and “No Fuel Remaining” conditions
- Single stay-in checklist – no need to refer to additional procedures or documents

Abnormal And Emergency Procedures
Ditching (Engine Thrust Available)

Ditching (Engine Thrust Available) – QRH procedure

- Designed assuming a planned (i.e., with reasonable amount of time available) ditching with engine thrust available
  - For example, a persisting cabin fire

Conclusion

- Airbus provides Aircraft Flight Manual (AFM) with abnormal and emergency procedures reviewed and approved by Aviation Authorities
- Airbus also provides reference documents to the Operators.
- Operators may revise these reference documents and must obtain applicable regulatory approvals for their Operating Manuals
- Airbus Procedures are revised as a result of:
  - new or changed regulatory requirements
  - aircraft design changes
  - in-service experience
  - operators feedback
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